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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,942	12/03/2003	Minhua Lu	YOR920030468US1 (17038)	5404
23389	7590	02/22/2006	EXAMINER	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			DUONG, THOI V	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/726,942

Applicant(s)

LU, MINHUA

Examiner

Thoi V. Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-12 and 14-22 ~~is/are~~ pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-12 and 14-22 ~~is/are~~ rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the Amendment filed December 14, 2005.

Accordingly, claims 1 and 12 were amended, and claims 2 and 13 were cancelled. Currently, claims 1, 3-12 and 14-22 are pending in this application.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 3-12 and 14-22 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, 5, 9, 11, 12, 14, 16, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et al. (US 2003/0214618 A1) in view of Lee (US 6,844,911 B2), Yamagishi et al. (Yamagishi, US 6,466,294 B1), and Stephanov et al. (Stephanov, US 5,963,289).

Re claims 1 and 12, as shown in Figs. 1-6, Tao discloses a method (as well as an arrangement) for the filling of liquid crystals to form liquid crystal cells on a silicon backplane or microdisplays 100, said silicon backplane being a semiconductor wafer 100 having said liquid crystal cells 300 formed thereon in a closely spaced array (page 1, paragraphs 6, 7, 14 and 25), said method comprising:

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forming spacer walls 150 (gold bump ring) on said silicon backplane 100 to provide a plurality of cells 300 surrounding active liquid crystal display areas (Figs. 3 and 6, and paragraph 26);

dispensing into each of said active liquid crystal display areas within said spacer walls 150 an exact amount of liquid crystals 132 (liquid crystal which has been measured) (Fig. 4 and paragraph 26);

laminating a top layer material 200 to said silicon backplane subsequent to the dispensing of said liquid crystals, said top layer material 200 being laminated with said dispensed liquid crystals 132 (Fig. 5 and paragraphs 27 and 28); and

dicing said silicon backplane 100 through said gaps along scribe line 101, 201 so as to form individual liquid crystal-filled cells 300 (Figs. 4-6 and paragraph 29).

Tao discloses a method for the filling of liquid crystals to form liquid crystal cells on a silicon backplane that is basically the same as that recited in claims 1 and 12 except for introducing a curable sealant into gaps externally of said spacer walls so as to fill said gaps with said sealant and a spacerless liquid crystal cell.

At first, as shown in Figs. 3 and 4, Lee discloses a method for fabricating liquid crystal cells comprising:

introducing a curable sealant (dummy seal pattern 74) into gaps 64 externally of spacer walls 72 so as to fill said gaps with said sealant (col. 2, lines 54-60); and

curing said sealant and dicing glass substrate 60 through said gaps 64 so as to form individual liquid crystal-filled cells (col. 3, lines 12-23 and col. 6, lines 40-43).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Tao with the teaching of Lee by introducing a curable sealant into gaps externally of the spacer walls to fill said gaps with said sealant for not only protecting said spacer walls but also preventing a breakdown of the glass substrate during cutting process (col. 3, line 67 through col. 4, line 4).

Accordingly, it is obvious that the step of dispensing the liquid crystal can be done after introduction of said sealant and that the top layer material is to be laminated with said curable sealant and said dispensed liquid crystals before dicing process.

Further, as shown in Fig. 1, Yamagishi discloses a liquid crystal display panel comprising a sealing material 3 containing a conductive spheres 9 employed for securely connecting electrodes 6 and 8 respectively formed on substrates 1 and 2 (col. 7, lines 15-26).

Also, as shown in Figs. 3 and 4, Stefanov discloses a micro liquid crystal display comprising a spacer wall 600 (gasket seal) mixed with spacers to provide cell gap control and uniformity. Stefanov also discloses that the small pixel format does not allow for the use of spacers in the active area (or spaceless active area) in constructing micro liquid crystal display (col. 3, lines 19-31).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the spacer walls (or gold bump rings) of Tao with the teaching of Yamagishi and Stephanov by forming a sealing material mixed with conductive spacers for not only securely connecting pads between substrates

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(Yamagishi, col. 7, lines 15-26) but also providing cell gap control and uniformity, and a spacerless viewing area having an image magnified and presented to the viewer (Stephanov, col. 3, lines 19-24).

Re claims 3 and 14, as shown in Fig. 3, Tao discloses that the spacer walls 150 are configured to form essentially rectangular liquid crystal cells.

Re claims 5 and 16, as shown in Fig. 1, Tao discloses that the top layer material 211 comprises a glass window of a size commensurate with the size of said silicon backplane 111 (paragraph 22).

Re claims 9 and 20, as shown in Fig. 4, Stephanov discloses the surfaces of silicon backplane 400 and of top layer material 500 facing spacer walls 600 are each provided with a layer of an alignment material 820 and 810 respectively (col. 4, lines 17-23).

Re claims 11 and 22, as mentioned above, Stephanov discloses arranging discrete spacer posts or balls in the areas between said spacer wall 600 containing said sealant so as to mechanically strengthen said liquid crystal displays (col. 3, lines 19-31).

5. Claims 4, 7, 8, 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et al. (US 2003/0214618 A1) in view of Lee (US 6,844,911 B2), Yamagishi et al. (Yamagishi, US 6,466,294 B1), and Stephanov et al. (Stephanov, US 5,963,289) as applied to claims 1, 3, 5, 9, 11, 12, 14, 16, 20 and 22 above and further in view of Liao et al. (Liao, USPN 6,681,005 B2).

The method of Tao as modified in view of Lee, Yamagishi and Stephanov above includes all that is recited in claims 4, 7, 8, 15, 18 and 19 except for the cell size, the

thickness of the spacer walls, and a selective pressure applied to said spacer walls during introduction of said sealant into said gaps so as to facilitate control over the uniformity of said gaps about the liquid crystal cells and to provide a support for the silicon backplane during the assembly of said cells.

Re claims 4 and 15, Liao discloses a LCOS panel consisting of a glass substrate 102 and a silicon substrate, wherein the LCOS panel has a general panel size of 0.7 inch (17.5 mm), 0.9 inch (22.5 mm) or 1.3 inch (32.5 mm) (col. 2, lines 4-27).

Re claims 7 and 18, as shown in Figs. 6-8, Liao discloses a process for forming a uniform cell gap, wherein a local pressure is applied to a spacer wall 606 from a hot press apparatus including hot plates 702, 704 and cushions 706, 708 (col. 5, line 36 through col. 6, line 20),

wherein, re claims 8 and 19, the uniform cell gap is approximately 15-20 micrometer (col. 5, lines 39-42). Accordingly, the spacer wall 606 also has the same thickness as the cell gap.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Tao with the teaching of Liao by applying selective pressure to said spacer walls during introduction of said sealant into said gaps so as to facilitate control over the uniformity of said gaps about the liquid crystal cells and to provide a support for the silicon backplane during the assembly of said cells (col. 5, line 36 through col. 6, line 20).

6. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et al. (US 2003/0214618 A1) in view of Lee (US 6,844,911 B2), Yamagishi et al.

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(Yamagishi, US 6,466,294 B1), and Stephanov et al. (Stephanov, US 5,963,289) as applied to claims 1, 3, 5, 9, 11, 12, 14, 16, 20 and 22 above and further in view of Cohn (Pub. No. US 2002/0179921 A1).

The method of Tao as modified in view of Lee, Yamagishi and Stephanov above includes all that is recited in claims 6 and 17 except for the spacer walls being formed lithographically on the silicon substrate. However, the lithographical process for forming sealant structures (spacer walls) on the silicon substrate is well known in the art as disclosed by Cohn to seal two substrate together (paragraphs 11 and 53).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to lithographically form the spacer walls on the silicon substrate as taught by Cohn to improve seal reliability and performance (paragraph 62).

7. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et al. (US 2003/0214618 A1) in view of Lee (US 6,844,911 B2), Yamagishi et al. (Yamagishi, US 6,466,294 B1), and Stephanov et al. (Stephanov, US 5,963,289) as applied to claims 1, 3, 5, 9, 11, 12, 14, 16, 20 and 22 above and further in view of Brosig et al. (Brosig, USPN 5,106,441).

The method of Tao as modified in view of Lee, Yamagishi and Stephanov above includes all that is recited in claims 10 and 21 except for the dispensing of said liquid crystals and sealant and lamination implemented under vacuum.

However, Brosig discloses a similar process for manufacturing a liquid crystal cell comprising implementing the dispensing of said liquid crystals and sealant and lamination under a vacuum (col. 1, line 60 through col. 2, line 15).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Tao with the teaching of Brosig by implementing the dispensing of liquid crystal and sealant and lamination under a vacuum to eliminate the evacuation time and obtain a stable cell (col. 1, lines 53-57 and col. 2, lines 12-13).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi Duong



02/18/2006


ANDREW SCHECHTER
PRIMARY EXAMINER